

We Claim

1. A polishing composition suitable for polishing semiconductor substrates comprising:

0.001 to 2 wt% of a thermoplastic polymer; and

0.001 to 1 wt% of polyvinylpyrrolidone; wherein varying the weight ratio of thermoplastic polymer to the polyvinylpyrrolidone controls the removal rate of the non-ferrous interconnect.

2. The composition of Claim 1, wherein the thermoplastic polymers are polyacetals, polyacrylics, polycarbonates polystyrenes, polyesters, polyamides, polyamideimides, polyarylates, polyarylsulfones, polyethersulfones, polyphenylene sulfides, polysulfones, polyimides, polyetherimides, polytetrafluoroethylenes, polyetherketones, polyether etherketones, polyether ketone ketones, polybenzoxazoles, polyoxadiazoles, polybenzothiazinophenothiazines, polybenzothiazoles, polypyrazinoquinoxalines, polypyromellitimides, polyquinoxalines, polybenzimidazoles, polyoxindoles, polyoxoisindolines, polydioxoisindolines, polytriazines, polypyridazines, polypiperazines, polypyridines, polypiperidines, polytriazoles, polypyrazoles, polycarboranes, polyoxabicyclononanes, polydibenzofurans, polyphthalides, polyacetals, polyanhydrides, polyvinyl ethers, polyvinyl thioethers, polyvinyl alcohols, polyvinyl ketones, polyvinyl halides, polyvinyl nitriles, polyvinyl esters, polysulfonates, polysulfides, polythioesters, polysulfones, polysulfonamides, polyureas, polyphosphazenes, polysilazanes, or a combination comprising at least one of the foregoing thermoplastic polymers.

3. The composition of Claim 1, further comprising 0.1 to 40 wt% of silica particles.

4. The composition of Claim 1, wherein the thermoplastic polymer is a polyvinylalcohol having a weight average molecular weight of 1,000 to 1,000,000 grams per mole and a degree of hydrolyzation of at least 20 mole percent, wherein the mole percent is based upon the total number of moles of the polyvinylalcohol.

5. The composition of Claim 1, wherein the polyvinylpyrrolidone has a weight average molecular weight of 100 to 1,000,000 grams per mole.

6. The composition of Claim 1, wherein the polyvinylpyrrolidone and the thermoplastic polymer is present in the polishing composition in a weight ratio of 1:10 to 100:1 respectively.

7. A polishing composition suitable for polishing semiconductor substrates comprising:

0.001 to 2 wt% of polyvinyl alcohol having a weight average molecular weight of 13,000 to 23,000 g/mole;

0.001 to 1 wt% of polyvinylpyrrolidone having a weight average molecular weight of 3,000 to 10,000 g/mole;

up to 10 wt% of a corrosion inhibitor;

up to 15 wt% complexing agent;

up to 10 wt% of an oxidizing agent; and

0.1 to 40 wt% of a silica abrasive; wherein the polishing composition has a pH of at least 7, and further wherein varying the weight ratio of thermoplastic polymer to the polyvinylpyrrolidone controls the removal rate of the non-ferrous interconnect.

8. A method of polishing a semiconductor substrate comprising the steps of:  
applying a polishing composition comprising 0.001 to 2 wt% of a thermoplastic polymer; and 0.001 to 1 wt% of polyvinylpyrrolidone to a semiconductor substrate; and  
polishing the semiconductor substrate at a pad pressure less than or equal to 21.7 kiloPascals, wherein varying the weight ratio of thermoplastic polymer to the polyvinylpyrrolidone controls the removal rate of the non-ferrous interconnect.

9. The method of Claim 8, wherein the polishing composition facilitates a removal rate of less than or equal to 150 Angstroms/minute for the low-k dielectric layer.

10. The method of Claim 8, wherein the polishing composition facilitates a removal rate of greater than or equal to 150 Angstroms/minute for the low-k dielectric layer.